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(TRANSLATION)

Japanese Laid-open Patent Publication (Kokai)
No. 206402/97

Laid-open (Kokai) Date:	August 12, 1997
Title of Invention:	Emergency Fire-extingushing Equipment
Patent Application No.:	17312/96
Date Filed:	February 2, 1996
Inventors:	Takuji Nakamura, et al.
Applicant:	Shimizu Construction, Inc.

【0007】

【Form of Implemented Invention 】 In the followings the form of implemented invention is explained referring to the drawings. Fig. 1 is the drawing showing the form of the implemention of the emergency fire-extinguishing equipment related to this invention. 1 is the air-conditioning water-heat-accumulating, 2 is the bleeding-valve, 3 is the comressed-gas pipe, 4 is the comressed-gas bomb, 5 is the automatic-valve, 6,7 are water-sending pipe, 8 is the sprinkler, 9 is the in-house water-hydrant, 10, 11 are water-sending pump, 12, 13 are the pump-water-take-in part.

【0008】 In Fig. 1, the air-conditioning water-heat-accumulating tank 1 is used as the air-conditioning heat-source, at the same time used as fire-extinguishing water-source, and they are closed, the closed, vertical-type fire-extinguishing used for the muti-purpose, on top part there is the air-bleeding valve 3, then pressurized by the compressed gas. The water-sending pipe 6 is the sprinkler water-sending pipe to send water to the sprinkler 8, connected to the pump-water-let-in 12 arranged in the bottom-part of the air-conditioning water-heat-accumulating, at the same time in the lower-floors connected to the air-conditioning water-heat-accumulating tank 1, and form the water-sending route bypassing the water-sending route. The direct-contacting part of the air-conditioning water-heat-accumulating tank 1 is not only the water-sending by the air-conditioning water-heat-accumulating tank, but even if all the circuit becomes completely impossible, the water sending can be done by the natural water-flowdownsd. The water-sending pipe 7 is the in-house water-hydrant water-sending pipe, connected to the pump water let-in part 13. The automatic-valve 5 is closed in condition the voltage is imposed, but in the black-out, for example, function is in the opening direction by the gas-pressure or the spring-pressure, in the time of black-out the flowing-path is automatically opened to supply the compressed-gas to the air-conditioning water-heat-accumulating tank 1 by means

of the air-bleeding valve 3 from the compressed-gas bomb 4.

【0009】 In the aforemantioned constitution, in the time of normal fire-eruption, the water-sending pump 10, 11 are driven, and the water is sent to the in-house water-hydrant 9, the sprinkler 9 by means of the water-sending pump 10, 11, the water-sending pipes 6, 7 by supplying the compressed-gas with the automatic-valve 5 open in the time of the when the electric-appliances faulted such as the earth-equake, the disaster black-out, emergency-generator-fault, the battery-fault, the water-sending pump 10, 11 become total function-fault. Namely the water is sent without outside-power just by the compressed-gas pressure applied. Yet the compressing pressure is sent by means of the low-flower water-sending pipe 6, the water in the air-conditioning water-heat-accumulating tank 1 can be effectively used, and the compressed-gas inside can be prevented discharging from the sprinkler. Further according to the aforementioned constitution, the water-sending pipe 6 is directly connected to the air-conditioning water-heat-accumulating tank 1, thereby as mentioned before, even if the pressure of the air-conditioning water-heat-accumulating tank 1 is not enough, the water-sending can be done by the natural flowdown utilizing the fall-head.

【0010】 For example as the vertical-type water-heat-accumulating tank 1, in case the 300㎤, 20m, inner-dismeter 4.4m, bottom-area 15.2㎡, water-level 20m, top-air layer 0.5m are used, the specific calculating-example is explined. Now the 5th floor is fire-extinguished using the sprinkler. The pressure necessary in the water-sending part in the sprinkler-head end is set 1.0kgf/㎠, the drop-head 2.0kgf/㎠, the friction-loss 0.5kgf/㎠ added, total 3.5kgf/㎠ is assumed. Thereby to the air-layer, 3.5kgf/㎠, to the heat-accumulated water 4.5 kgf/㎠ is needed for the water-sending pressure in the bomb-side. In the vertical-type water-heat-accumulating tank, the water-self-weight can be added to the water-sending pressure, the water-self weights are different between the start and the end, accordingly the self-water-weight has to be converted from the mean-value of the start and the end. The pressure necessary in the bomb-side is 4.5-2.0=2.5kgf/㎠, when the waterl-level is 0m, it becomes 4.5kgf/㎠, the mean-value 3.0kgf/㎠ is used. The pressure of the gas bomb is used for the highest pressure 150kgf/㎠ that is most widely used.

【0011】 The compressed-gas capacity necessary for using the all the water in the vertical-type water-heat-accumulating tank 1. First of all the capacity necessary to make the accumulating-tank air layer nessesary-pressure:

【0012】

【Formula 1 】

$$15.2\ \text{m}^2 \times 1.5\text{m} \times 3.5\text{kgf/cm}^2 / 146.5\text{kgf/cm}^2 \fallingdotseq 0.5\ \text{m}^3$$

Next the capacity necessary to send water:

【0013】

[Formula 2]

15.2㎥x20mx3.0kgf/㎠ /147kgf/ ㎠≒6.2 ㎥

Accordingly 150kgf/ ㎠ compressed gas needs total 6.7m³.

[0014] Fig. 2 is the drawing of other implemented form of the emergency fire-extinguishing equipment related to this invention. 21 is the air-conditoning water-heat-accumulated tank, 22 is the air-tight hatch, 23 is the compressed-gas pipe, 24 is the compressed-gas bomb, 25, 34 are automatic-valves, 26, 27 are the water-sending pipes, 28 is the sprinkler, 29 is the in-house water-hydrant, 30, 31 are water-sending pumps, 32, 33 are water-take-in part.

[0015] 21 is the example adopted foundation-beam utilized heat-accumulating tank as the vertical-type water-heat-accumulating tank 21, from the water-taking parts 32, 33 are connected to the water-sending pipes 26, 27 by means of the water-sending pumps 30, 31, at the same time by the automatic valve 34, the water-sending route is constituted bypassing the water-sending pump. And in case the black-out when the water-sending pumps 30, 31 do not work, the valves 25, 34 are together opened. By these operation, from the compressed gas-bomb 24, the compressed-gas is sent, pressurized to the vertical-type water-heat-accumulating tank 21 by means of the automatic-valve 25, the compressed-gas pipe 23, thereby the water can be sent to the sprinkler 28 by means of the automatic-valve 34, the water-sending pipe 26 from the water-take-in part 32. Yet as shown in the drawings if the water-take-in parts 32, 33 are arranged further lower than under the bottom part of the air-conditoning water-heat-accumulated tank, the water in the vertical-type water-heat-accumulating tank 21 can be all used up.

[0016] For example, in case the under-ground heat-accumulating tank of 480 ㎥, the floor-area 300㎡, the water-level 1.6m, the air-layer 0.5m, the specific calculating example is explained. Now the fifth floor fire-extinguishing is to be done using the sprinkler. the water-sending part necessary pressure is 1.0kgf/㎠ kgf/ ㎠ at the end-part of the sprinkler, total 3.5kgf/㎠ with the fall worth of 2.0kgf/ ㎠, the friction-loss 0.5kgf/ ㎠ added. Thereby to the air-layer 3.5kgf/㎠, to the accumulated-heat water 4.5kgf/ ㎠ are the pressure necessary for sending-water of the bombe-side. The compressed-gas is nitrogen for the safety. The pressure of the compressed-gas bomb is 150kgf/㎠ for the highest normal use. [0017] The compressed-gas capacity necessary for total water in the heat-accumulating tank under the condition above is found. First of all the capacity necessary for the pressure of the accumulating-heat air-layer is:

[0018]

[Formula 3]

300㎡x0.5mx3.5kgf/ ㎠/146.5kgf/㎠≒3.6 ㎥

Next the capacity necessary to send wateris:

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(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号

特開平9－206402

(43)公開日　平成９年(1997)８月12日

(51)Int.Cl.⁶	識別記号	庁内整理番号	ＦＩ		技術表示箇所
A62C 39/00			A62C 39/00		
35/02			35/02		B
37/08			37/08		

審査請求　未請求　請求項の数４　ＯＬ　（全５頁）

(21)出願番号　特願平8－17312

(22)出願日　平成８年(1996)２月２日

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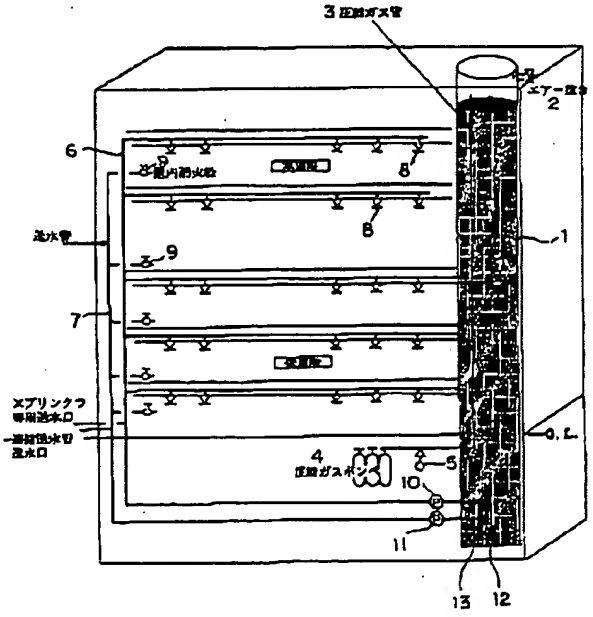
(54)【発明の名称】非常用消火設備

(57)【要約】

【課題】　電源設備の障害や送水ポンプ自体の故障があっても作動させることができ、設備コストの低減を図ることができるようにする。

【解決手段】　火災発生時に水源から送水管を介してスプリンクラーや消火栓に送水する非常用消火設備で、空調用水蓄熱槽１を水源とし、該空調用水蓄熱槽１と送水管６、７との間を送水ポンプ１０、１１を介して連結すると共に、送水ポンプをバイパスする送水経路を有し、送水ポンプ１０、１１の作動不能時に弁５を介して圧縮ガスボンベ４から圧縮ガスを空調用水蓄熱槽１に送り込んで加圧することにより、送水ポンプ１０をバイパスして空調用水蓄熱槽１から送水管６へ送水する。弁５に電源が供給されているときには閉じ、停電になると開く弁を用いることにより停電時に圧縮ガスを自動的に供給できる。



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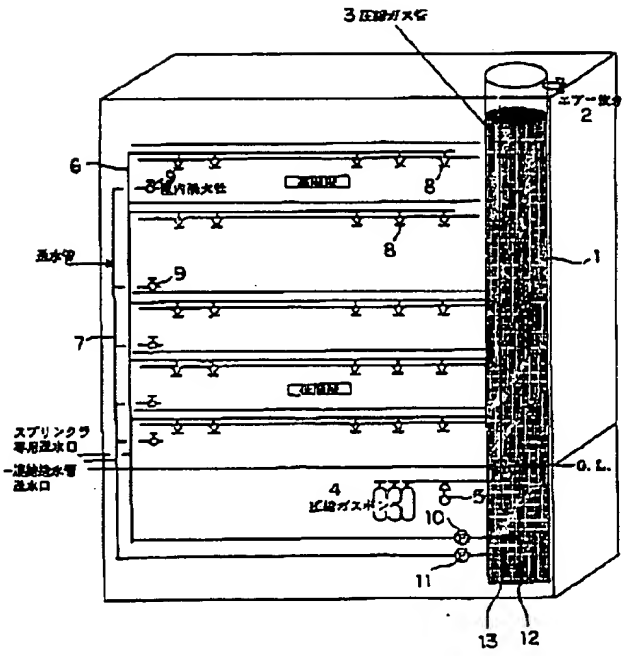
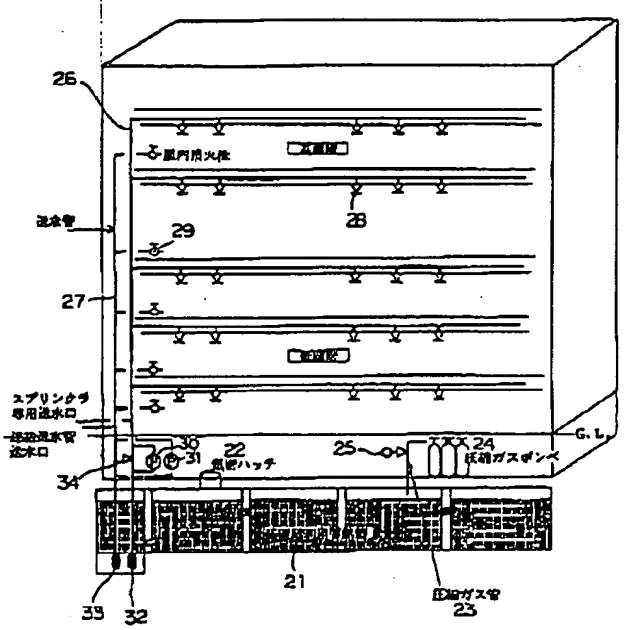
【図１】



【図２】



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